



## M005 Compact coupling system

Compact automatic couplers are commonly known as BSI couplers, they are the current standard for DMUs where inter-working between different unit types is required with provision for driver control of coupling and uncoupling at the cab ends, although not all variants are compatible electrically for multiple working.

### 1 Usage

Unit ends and some intermediate ends of second generation DMUs. The system allows automatic connection of vehicles.

### 2 System components

The system consists of the following elements:

- a) a BSI coupler head integral with a drawbar and a means of attaching the drawbar to the structure
- b) a drawbar spring unit which provides resilience in transferring longitudinal tensile and compressive loads between vehicles during coupling and train operation
- c) side control units which control and centralise the coupler
- d) a coupler suspension unit to support the coupler during coupling.

### 3 System types

All vehicles are generally similar and mechanically compatible with each other. However, only couplers used on unit ends have an electrical head to allow automatic connection of electrical connections during coupling which may not be electrically compatible between different classes.

Figure 1 shows a typical arrangement.

## 4 System descriptions

### 4.1 BSI coupler

The BSI coupler head is integral with the drawbar. The coupler head type is CK2, and all feature an integral pneumatic connection. Types used on vehicle ends fitted with gangways feature an attachment to drive the gangway.

When the couplers are connected there is no freedom of movement between the coupler heads and all relative vertical transverse and roll movements between vehicles are accommodated at the drawbar pivot.

Coupling is achieved automatically by moving one vehicle towards the other at slow speed. Couplings on curves (within limits) and between vehicles at different heights is accommodated by alignment wings on the coupler head. Coupling and uncoupling on unit ends is by couple/uncouple buttons in the driver's cab, which also isolate and connect the electrical supplies between vehicles. Confirmation of coupling can be obtained by a draw test and an interlock in the brake continuity wire. Automatic uncoupling is accommodated by coupler mounted pneumatic equipment. Manual uncoupling is available by the use of an uncoupling lever. Intermediate vehicles can only be uncoupled manually.

Prevention of overriding or gross transverse separation between vehicles during collisions and derailments is provided by the coupler engaging with the aperture in the headstock or with the coupler suspension units.

### 4.2 Drawbar spring units

Drawbar spring units consist of either a stack of rubber elements with steel dividing plates or a capsule type spring unit (known as a megi-spring). All spring units are preloaded by tensioning the tailpin.

### 4.3 Side control units

Side control units are generally rubber springs. As well as centralising the coupler the units provide rotational stiffness about the drawbar pivot in the horizontal plane and therefore contribute to the transverse inter-vehicle stiffness resisting lateral separation of vehicles during curve negotiation.



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### 4.4 Coupler suspension units

All types are fitted with equipment which supports the coupler at nominal height during coupling but allows freedom for connected couplers to accommodate inter-vehicle movements. Suspension units comprise a coil spring loaded plank supporting the coupler at the rear of the coupler head. The plank height is variable to allow adjustment of the coupler height.

### 4.5 System standards

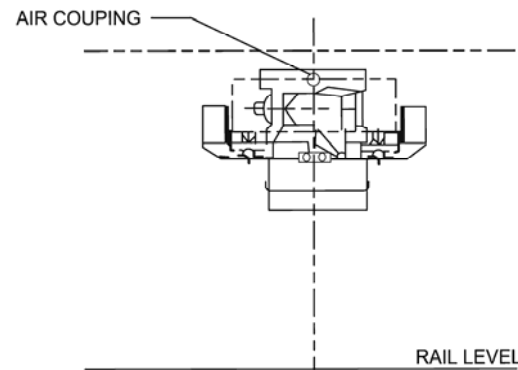
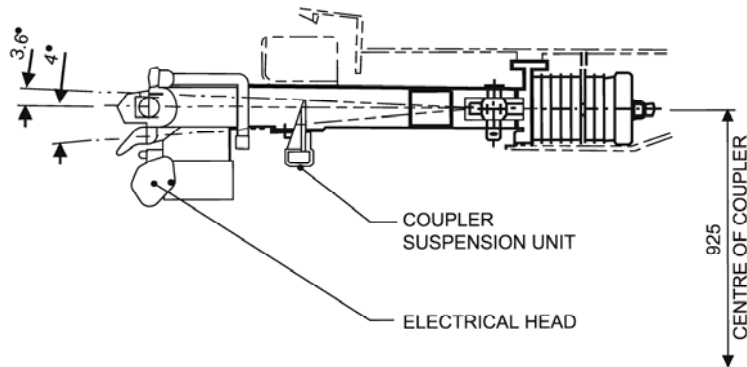
Specific requirements for each type of vehicle are set out in the vehicle specification.

Nominal coupler height above rail level is 925 mm for all types of DMU fitted with BSI couplers.

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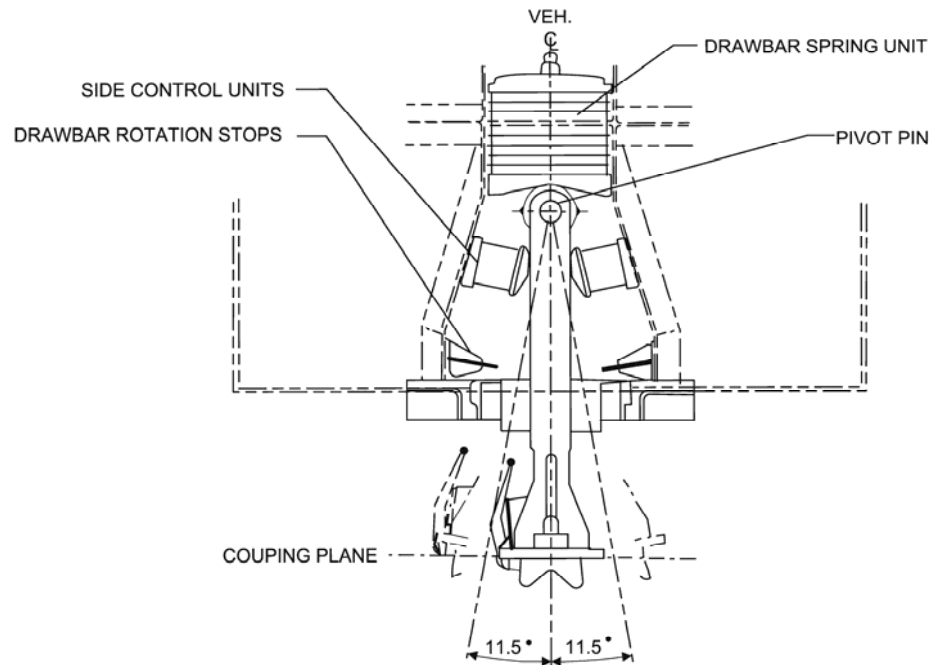
Figure 1 Typical BSI coupler arrangement for DMU

(Dimensions nominal)



### NOTES

1. Based On Class 158 (Cab End)
2. Reference Drgs
  - Arrangement 8008880 & 8008881
  - Automatic Coupler 8008882
  - Drawbar Spring Unit (See Arrangement)
  - Side Control Unit 8008889
  - Coupler Suspension Unit 8008890



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### 2.5 Compact coupling system

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#### 2.5.1 Usage

Unit ends and some intermediate ends of second generation DMUs. The system allows automatic connection of vehicles.

#### 2.5.2 System components

The system consists of the following elements:

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- a drawbar spring unit which provides resilience in transferring longitudinal tensile and compressive loads between vehicles during coupling and train operation
- side control units which control and centralise the coupler
- a coupler suspension unit to support the coupler during coupling.

#### 2.5.3 System types

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#### 2.5.4 System description

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Figure 2.5.1 Typical **BSI coupler arrangement** for DMU  
(Dimensions nominal)

